FISHERY RESEARCH

Wild Trout Investigations

Grant F-73-R-22

James A. Lamansky, Jr.
Sr. Fisheries Technician

F. Steven Elle
Sr. Fisheries Technician

Daniel J. Schill
Principal Research Biologist

IDFG Report Number 01-01
January 2001

Annual Performance Report

July 1, 1999 to June 30, 2000

Grant F-73-R-22

Project 2. Wild Trout Investigations

**Subproject 1: Wild Rainbow and Bull Trout Harvest—
Middle Fork Boise River Creel Survey**

Subproject 2: Bull Trout Monitoring Studies

By

James A. Lamansky, Jr.
Sr. Fisheries Technician

F. Steven Elle
Sr. Fisheries Technician

Daniel J. Schill
Principal Fisheries Biologist

Idaho Department of Fish and Game
600 South Walnut Street
P.O. Box 25
Boise, ID 83707

IDFG Report Number 00-01
January 2001

TABLE OF CONTENTS

Page

Table of Contents (Continued.)

List of Tables

List of Figures

Page

ANNUAL PERFORMANCE REPORT
SUBPROJECT #1: WILD RAINBOW AND BULL TROUT HARVEST—MIDDLE FORK BOISE RIVER CREEL SURVEY

State of: Idaho Grant No.: F-73-R-22, Fishery Research

Project No.: 2 Title: Wild Trout Investigations

Subproject 1: Wild Rainbow and Bull Trout Harvest—Middle Fork Boise River Creel Survey

Contract Period: July 1, 1999 to June 30, 2000

ABSTRACT

Angler effort, catch rates, total catch, and harvest were estimated on the Middle Fork Boise River in 1998 and 1999. In 1998, anglers spent an estimated 13,316 hours fishing with a catch rate of 1.11 fish/h for a total catch of 15,111 fish. In 1999, the angler effort, catch rate, and total catch increased to 21,057 h, 1.20 fish/h, and 25,280 fish, respectively. Harvest, however, decreased from 1,462 rainbow trout *Oncorhynchus mykiss* and 149 illegal bull trout *Salvelinus confluentus* in 1998 to 1,055 rainbow and zero bull trout in 1999. The decline in harvest is most likely due to a drainage specific educational effort to help anglers better recognize bull trout; it is possible anglers were not sure of what they were catching and therefore released more fish.

We compared estimates for the same sections during similar time periods from previous surveys from 1988-1990 and 1995. Effort, catch rates, and total catch estimates for the different survey sections in 1998 and 1999 were generally similar to estimates made in previous surveys. Total harvest in 1998 and 1999, however, was 20.5%-78.9% of that from previous surveys in the same sections and time periods.

Authors:

James A. Lamansky Jr.
Sr. Fisheries Technician

Daniel J. Schill
Principal Research Biologist

INTRODUCTION

Idaho Fish and Game managers are interested in the number of bull trout *Salvelinus confluentus* illegally harvested following the closure of the entire state to harvest of bull trout in 1996. In June 1998, bull trout were listed as threatened under the Endangered Species Act for the entire Columbia River System. Several recent studies (Schmetterling and Long 1999; Schill and Lamansky 1999) have shown that anglers' poor ability to identify trout species may be contributing to the incidental harvest of sensitive species such as bull trout. The Middle Fork Boise River drainage is known to have a relatively large population of resident and adfluvial forms of bull trout. Adfluvial bull trout in this system spend winters in Arrowrock Reservoir and migrate considerable distances to spawn (Flatter 1998). This makes them potentially susceptible to incidental harvest due to misidentification by anglers in the river during spring and summer.

We conducted a creel survey and estimated angler effort, harvest, and catch rates for the Middle Fork Boise River fishery during the 1998 and 1999 angling seasons. The primary focus of this effort was to compare harvest of bull trout before and after the implementation of an intensive educational effort being conducted by a companion research project (Schill and Lamansky in press). Specifically, we sought to determine if incidental harvest of bull trout due to misidentification was being reduced.

We also desired to compare existing angler effort, catch rates, and harvest to results from several earlier survey efforts. Historical data from several years exists for the Middle Fork Boise River (Rohrer 1988,1989,1990; Allen et al 1998); however, no creel survey data exists for its principal tributary, the North Fork Boise River. Prior surveys were conducted to monitor the fishery before and after a regulation change in 1990. The regulation changed for the river section from the confluence of the North Fork Boise River to Kirby Dam near Atlanta, Idaho from the general six fish daily limit to a daily limit of only two trout longer than 350 mm. Gear was also restricted to flies or lures only with a single barbless hook, and bait use was prohibited.

OBJECTIVES

1. To estimate bull trout harvest before and after an angler education program.

2. To compare angler effort, catch rate, harvest, and total catch estimates for all species to past creel surveys.

STUDY AREA

The study area is the Middle Fork Boise River above Arrowrock Dam. It lies approximately 20 km northeast of the city of Boise, Idaho and drains the western side of the Sawtooth Mountains in a southwesterly direction. The entire study area is accessible by road and contains several campgrounds and dispersed camping sites. In a prior study, the Middle Fork Boise River drainage was stratified into five sections for the purpose of surveying anglers' ability to identify trout (Figure 1, Schill and Lamansky 1999). Sections were defined based on fishing regulations, but also were selected to mirror those used in previous surveys (Rohrer 1989, 1990, 1991; Allen 1998).

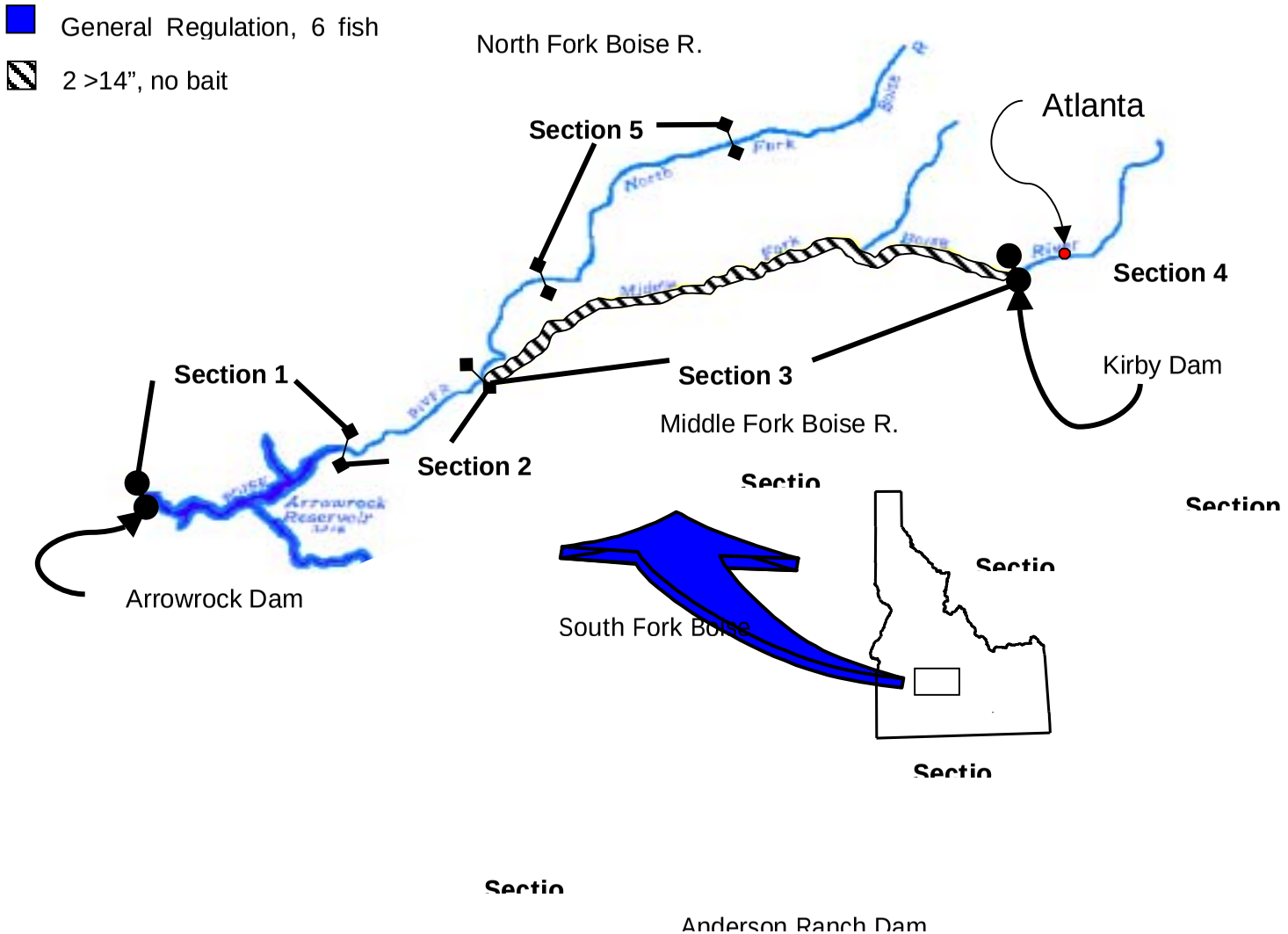

Figure 1. The Middle Fork Boise River drainages and sections used in the 1998 and 1999 creel survey.

Section 1—Arrowrock Reservoir

Section 1 is Arrowrock Reservoir, which extends 29.9 km from Arrowrock Dam to Willow Creek campground. The reservoir has a surface area of 1275 ha at full pool. Section 1 is managed with the six fish daily limit and no bait or gear restriction.

Section 2—Middle Fork Boise River

Section 2 is 16.9 km long and extends from the slackwater limit of Arrowrock Reservoir at Willow Creek Campground upstream to the confluence of the North Fork Boise River. Section 2 is managed with the six fish daily limit and no bait or gear restriction.

Section 3—Middle Fork Boise River

Section 3 is 56.3 km long, from the North Fork Boise River confluence upstream to Kirby Dam located near Atlanta, Idaho. Trout harvest in Section 3 is limited to two trout per day exceeding 350 mm. Only flies or lures with a single barbless hook may be used, and bait use is prohibited.

Section 4—Middle Fork Boise River

Section 4 is only the slackwater in the first 1 km above Kirby Dam. Regulations for Section 4 are the six fish daily limit with no bait or gear restriction.

Section 5—North Fork Boise River

Section 5 is the roaded portion of the North Fork Boise River from the confluence of Rabbit Creek upstream to the Deer Park Bridge. Section 5 is approximately 25.1 km long and is managed with the six fish daily limit and no bait or gear restriction.

METHODS

Angler Effort and Harvest

A creel survey was conducted from the statewide fishing opener on May 23 through September 5, 1998 and May 29 through September 6, 1999. During the 1999 survey period, Section 4 was not surveyed due to low numbers of anglers, travel distance, and lack of historical creel information. One weekday and one weekend day were chosen randomly for each week during the survey period in 1998. In 1999, two weekdays and one weekend day were chosen each week. The survey periods were stratified into four 28-day intervals. Due to time constraints and the large area of the drainage, a single count was conducted for all four sections on each survey date, and count start times were not chosen randomly. We varied the direction counts were conducted (upstream or downstream) to provide variation in count times in the sections. We typically began counts around 0900 and ended by 2100 hours. All accessible

anglers were interviewed as they were encountered on count days to determine creel and catch/effort data in each section during the count periods.

Estimated angler effort was calculated by multiplying mean daylight hours in the interval times by the mean angler count totals and the number of day types in the interval (weekend or weekday). Holidays (Memorial Day, Fourth of July, and Labor Day) were counted as weekend days. Effort was calculated separately for weekend days and weekdays then summed for the interval (McArthur 1992).

Catch and harvest rates were calculated for each species by dividing the number of fish caught and harvested by angler effort for each interval and section. Catch was estimated by multiplying the catch rates by angler effort. Total catch for each section was estimated by summing the catch for the intervals. Harvest was estimated separately for weekday and weekend day types by multiplying the harvest rate by angler effort and the number of day types in each interval. Season-long harvest for each section was calculated by summing the interval harvest estimates.

RESULTS

Overview

We estimated angler effort in Section 1 at 10,459 hours in 1998 and 9,138 hours in 1999, which include both bank and boat anglers. Monthly estimates of effort are shown in Table 1. We estimated anglers spent an average of 4.2 (n=10) and 2.4 (n=5) hours per trip in Section 1 in 1998 and 1999, respectively. However, because of manpower restraints and the large geographical size of the section, we made no attempt to estimate catch rates or harvest in either year. As a result, summary statistics for the rest of the river surveyed will be reported separately.

In 1998, anglers in Sections 2, 3 and 5 of the Middle Fork Boise River spent an estimated 13,613 hours fishing with a catch rate of 1.11 fish/h for a total catch of 15,111 fish. In the same sections, angler effort increased 35.4% in 1999 to an estimated 21,057 hours fishing; catch rate increased 7.5% to 1.20 fish/h. Total catch also increased 40.2% to 25,280 fish (Table 2). Harvest of bull trout decreased from an estimated 149 fish in 1998 to zero in 1999 after an intense, drainage-specific educational effort targeting bull trout identification ability. Harvest of rainbow trout also decreased from 1,462 in 1998 to 1,055 in 1999. Hatchery and wild rainbow were not differentiated in 1998. However, they were in 1999 when 824 wild rainbow and 231 hatchery rainbow were harvested.

Section 2

In 1998, Section 2 anglers spent 5,283 hours fishing with a catch rate of 0.86 fish/h. We estimated that 848 fish were harvested with a total of 4,520 fish caught. Effort and catch rate in 1999 increased to 7,341 hours and 0.94 fish/h, respectively. A total of 6,893 fish were caught in 1999, while harvest decreased to 598 fish (Table 3).

Table 1. Estimated total angler efforts for Section 1 by interval on the Middle Fork Boise River from May 23 through September 5, 1998 and May 29 through September 6, 1999.

Year	Date	Interval	Angler Effort (h)
1998			
	5/23-6/19	1	3,690
	6/20-7-17	2	4,312
	7/18-8/14	3	1,494
	8/15-9/5	4	963
	Total		10,459
1999			
	5/29-6/25	1	3,559
	6/26-7/23	2	2,181
	7/24-8/20	3	2,480
	8/21-9/6	4	918
	Total		9,138

Table 2. Estimated total angler effort, harvest, catch, and catch rates for all sections[a] on the Middle Fork Boise River drainage, May 25 through September 5, 1998 and May 29 through September 6, 1999.

Year	Date	Catch Rates (fish/h)	Angler Effort (h)	Harvest					Released	Total Caught
				WRB[b]	HRB	BT	Other[c]	Total		
1998										
	Section 1		10,459							
	Section 2	0.86	5,283	726		87	35	848	3,672	4,520
	Section 3	1.60	4,247	57		15	503	575	6,206	6,781
	Section 4[d]	0.59	1,158	552		29	26	607	78	685
	Section 5	0.93	4,083	679		18	21	718	3,092	3,810
	Section 2,3,5	1.11	13,613	1,462		120	559	1,141	12,970	15,111
1999										
	Section 1		9,138							
	Section 2	0.94	7,341	539	59	0	0	598	6,295	6,893
	Section 3	1.33	8,786	23	0	0	0	23	11,682	11,705
	Section 4									
	Section 5	1.36	4,930	262	172	0	0	434	6,248	6,682
	Section 2,3,5	1.20	21,057	824	231	0	0	1055	24,225	25,280

[a] Only effort for Section 1 is shown and is not included in the totals.
[b] Wild and hatchery rainbow were combined in 1998.
[c] Includes cutthroat, whitefish, northern pikeminnow, sucker spp., smallmouth bass, and/or yellow perch.
[d] Section 4 data from 1998 are shown, but not included in totals.

Table 3. Estimated total angler effort, harvest, catch, and catch rates for Section 2 by interval on the Middle Fork Boise River from May 23 through September 5, 1998 and May 29 through September 6, 1999.

Year	Date	Interval	Catch Rates (fish/h)	Angler Effort (h)	Harvest					Released	Total Caught
					WRB[a]	HRB	BT	Other[b]	Total		
1998											
	5/23-6/19	1	1.38	1,135	99		66	0	65	1,406	1,571
	6/20-7-17	2	0.34	679	62		21	0	83	148	231
	7/18-8/14	3	0.64	1,291	104		0	10	114	707	821
	8/15-9/5	4	1.24	1,530	461		0	25	486	1,411	1,897
	Total		0.86	5,283	726		87	35	848	3,672	4,520
1999											
	5/29-6/25	1	0.19	574	0	36	0	0	36	72	108
	6/26-7/23	2	0.46	1,404	0	0	0	0	0	639	639
	7/24-8/20	3	1.36	3,756	300	0	0	0	30	4,795	5,095
	8/21-9/6	4	0.65	1,607	239	23	0	0	262	789	1,051
	Total		0.94	7,341	539	59	0	0	598	6,295	6,893

[a] Wild and hatchery rainbow were combined in 1998.
[b] Includes cutthroat, whitefish, northern pikeminnow, and/or sucker spp.

Section 3

In 1998, anglers in Section 3 expended an estimated 4,247 hours fishing with a catch rate of 1.60 fish/h, caught a total of 6,781 and harvested 575 fish. Angler effort in 1999 more than doubled in Section 3 to 8,786 hours. The 1999 catch rate was estimated to be 1.33 fish/h with 11,705 fish being caught. The harvest estimate declined considerably to only 23 fish (Table 4).

Section 4

Anglers in Section 4 spent an estimated 1,158 hours fishing with a catch rate of 0.59 fish/h. They caught an estimated total of 685 fish in 1998 and harvested 607 fish (Table 5). No creel information was collected for Section 4 in 1999.

Section 5

Estimated effort in 1998 on Section 5 was 4,083 hours. The estimated catch rate was 0.93 fish/h; harvest and total catch estimates were 718 and 3,810 fish, respectively. In 1999, effort increased to 4,930 hours and catch rate to 1.36 fish/h, respectively. Estimated total catch also increased to 6,682 fish, while harvest decreased to 434 fish (Table 6).

Bull Trout Harvest

In 1998, anglers harvested an estimated total of 149 illegal bull trout due to misidentification or lack of regulation awareness; 87 in Section 2, 15 in Section 3, 29 in Section 4, and 18 in Section 5 (Table 7). Estimated illegal bull trout harvest rates for Sections 2 through 5 were 0.016, 0.004, 0.025, and 0.004 fish/h, respectively. Five bull trout were seen in angler creels. Four were between 300 mm and 400 mm in length, and one exceeded 500 mm. The season long harvest rate for bull trout in all sections combined was 0.006 fish/h. In 1999, no bull trout were observed in angler creels (Table 7).

Table 4. Estimated total angler effort, harvest, catch, and catch rates for Section 3 by interval on the Middle Fork Boise River from May 23 through September 5, 1998 and May 29 through September 6, 1999.

Year	Date	Interval	Catch Rates (fish/h)	Angler Effort (h)	Harvest					Released	Total Caught
					WRB[a]	HRB	BT	Other[b]	Total		
1998											
	5/23-6/19	1	0.25	270	27		0	0	27	41	68
	6/20-7-17	2	0.44	855	0		15	0	15	363	378
	7/18-8/14	2	2.12	1,871	0		0	406	406	3,551	3,957
	8/15-9/5	4	1.90	1,251	30		0	97	127	2,251	2,378
	Total		1.60	4,247	57		15	503	575	6,206	6,781
1999											
	5/29-6/25	1	0.32	506	0	0	0	0	0	163	163
	6/26-7/23	2	0.28	1,131	0	0	0	0	0	319	319
	7/24-8/20	3	2.03	4,003	7	0	0	0	7	8,113	8,120
	8/21-9/6	4	.99	3,146	16	0	0	0	16	3,087	3,103
	Total		1.33	8,786	23	0	0	0	23	11,682	11,705

[a] Wild and hatchery rainbow were combined in 1998.
[b] Includes cutthroat, whitefish, northern pikeminnow, and/or sucker spp.

Table 5. Estimated total angler effort, harvest, catch, and catch rates for Section 4 by interval on the Middle Fork Boise River from May 23 through September 5, 1998. Section 4 was not surveyed in 1999.

Year	Date	Interval	Catch Rates (fish/h)	Angler Effort (h)	Harvest					Released	Total Caught
					WRB[a]	HRB	BT	Other[b]	Total		
1998											
	5/23-6/19	1	0.0	203	0		0	0	0	0	0
	6/20-7-17	2	0.06	442	0		0	26	26	0	26
	7/18-8/14	2	0.44	261	87		29	0	116	0	116
	8/15-9/5	4	2.16	252	465		0	0	465	78	543
	Total		0.59	1,158	552		29	26	607	78	685

[a] Wild and hatchery rainbow were combined in 1998.
[b] Includes cutthroat, whitefish, northern pikeminnow, and/or sucker spp.

Table 6. Estimated total angler effort, harvest, catch, and catch rates for Section 5 by interval on the Middle Fork Boise River from May 23 through September 5, 1998 and May 29 through September 6, 1999.

Year	Date	Interval	Catch Rates (fish/h)	Angler Effort (h)	Harvest					Released	Total Caught
					WRB[a]	HRB	BT	Other[b]	Total		
1998											
	5/23-6/19	1	0.00	728	0		0	0	0	0	0
	6/20-7-17	2	0.45	690	0		0	0	0	307	307
	7/18-8/14	2	1.05	1,450	370		18	0	388	1,132	1,520
	8/15-9/5	4	1.63	1,215	309		0	21	330	1,653	1,983
	Total		0.93	4,083	679		18	21	718	3,092	3,810
1999											
	5/29-6/25	1	0.09	375	35	0	0	0	35	0	35
	6/26-7/23	2	1.26	1,164	114	0	0	0	114	1,349	1,463
	7/24-8/20	3	1.79	1,987	78	65	0	0	143	3,419	3,562
	8/21-9/6	4	1.16	1,404	35	107	0	0	142	1,480	1,622
	Total		1.36	4,930	262	172	0	0	434	6,248	6,682

[a] Wild and hatchery rainbow were combined in 1998.
[b] Includes cutthroat, whitefish, northern pikeminnow, and/or sucker spp.

Table 7. Comparison of estimated harvest and harvest rates of bull trout (BT) by section for different survey years on the Middle Fork Boise River.

Section	Year	Date	Angler Effort (h)	Estimated BT Harvest	Harvest Rate (BT/h)
2	1988	5/28-9/2	4653	26	0.006
2	1989	5/27-9/1	4812	79	0.016
2	1990	5/26-8/31	6598	117	0.018
2	1998	5/23-9/5	5283	87	0.016
2	1999	5/29-9/6	7341	0	0.00
3	1988	5/28-9/2	2935	177	0.06
3	1989	5/27-9/1	1575	50	0.032
3[a]	1998	5/23-9/5	4247	15	0.004
3[a]	1999	5/29-9/6	8786	0	0.00
4	1998	5/23-9/5	1158	29	0.025
5	1998	5/23-9/5	4083	18	0.004
5	1999	5/29-9/6	4930	0	0.00

[a] Section lengths in 1998 and 1999 were 40.6 km longer than in 1988 and 1989.

Rainbow Trout Harvest

In 1998, anglers harvested an estimated 2,014 rainbow trout: 726 in Section 2, 57 in Section 3, 552 in Section 4, and 679 in Section 5. Harvest rates for rainbow were 0.14, 0.013, 0.48, and 0.17 fish/h for Sections 2 through 5, respectively.

Total rainbow harvest decreased in 1999 to 1,055. We estimated a total of 824 wild rainbow trout (WRB) and 231 hatchery rainbow trout (HRB) were harvested. This included 539, 23, and 262 WRB and 59, 0, and 172 HRB in Sections 2, 3, and 5 respectively. Harvest rates for WRB were 0.073, 0.003 fish/h for Sections 2 and 3, and 0.053 fish/h for Section 5. Harvest rates for HRB were 0.008, 0.00 fish/h for Sections 2 and 3, and 0.035 fish/h for Section 5. We estimated the season-long, stream-wide harvest rate for rainbow trout to be 0.086 fish/h in 1998. In 1999, harvest rates were estimated to be 0.029 fish/h for WRB and 0.008 fish/h for HRB.

Sections 2, 4, and 5 are stocked annually with catchable rainbow trout. Because wild and hatchery rainbow trout were not differentiated in 1998, it is impossible to estimate hatchery return rates for that year. However, in Sections 2 and 5 during 1999, 2,775 and 8,090 hatchery catchable rainbow were planted in each section, respectively. The 1999 estimated return rate on HRB for both sections was 2.1%. Section 4 was not surveyed in 1999.

DISCUSSION

Before the 1999 season, an intense educational effort was enacted in the Middle Fork Boise River Drainage in an attempt to help anglers recognize bull trout. A slogan featured in the effort was "If you don't know, be safe and let it go" (Schill and Lamansky in press). The decreased harvest from 149 bull trout in 1998 to zero in 1999, as well as the reduced harvest of rainbow from 2,014 in 1998 to 1,055 in 1999 despite an increase in effort and catch rate (Table 2), would suggest that some anglers were not sure what they were catching and opted to release more fish.

Results from 1998 suggest that prior to the intense signing program (Schill and Lamansky in press), illegal bull trout harvest in Section 2 was within the range of previous harvest estimates in the same section (Rohrer 1989, 1990, 1991). An estimated 87 bull trout were harvested in 1998 compared to 26, 79, and 117 bull trout during the 1988-1990 seasons when harvest was legal (Table 6). The harvest rate for bull trout from Section 2 in 1998 of 0.016 fish/h was also comparable to catch rates (0.006, 0.016, and 0.018 fish/h) reported in previous years.

However, bull trout harvest in Section 3 during 1998 was substantially lower compared to the previous surveys of 1988-1990. Bull trout harvest ranged from 50-177 fish during the survey years when harvest was legal compared to only 15 fish in 1998. This 70%-92% decline is actually an underestimate as well, because an additional 40.6 km was included in the 1998-1999 harvest estimates. Bull trout harvest rates during the previous survey periods ranged from 0.06-0.032 fish/h, but declined to 0.004 fish/h during 1998. However, the 1990 regulation change in Section 3 restricted the use of bait, so the reduced harvest rate for bull trout in 1998 may be due to both angler knowledge of the no-harvest regulation and the restriction of bait anglers.

While the objective to estimate angler effort, catch rates, and harvest was accomplished, no confidence limits were calculated for estimates made in 1998 and 1999. Due to the geographical size of the area and manpower constraints, we were unable to randomize start times for the survey sections. However, we conducted angler counts in the various sections at all times of the day on the river during virtually the entire 1998 and 1999 seasons. In addition, a large number of anglers were interviewed in both 1998 (n=436) and 1999 (n=487). Thus, while we opted to not place confidence intervals on the 1998 or 1999 estimates, the point estimates of harvest and harvest rates should be accurate. While the logic of this observation seems reasonable, we cannot rule out that our count methods could have biased the results.

Catch rates and harvest were not estimated for Section 1 because of the lack of boat angler interviews. Although some boat anglers were interviewed, an effort was not made to target them specifically because of manpower and time restraints. We believe catch rate and harvest estimates would have been severely biased without the boat angling component. However, we do believe that the effort estimates are accurate because boat counts were conducted on each sampling day. The effort estimate is also probably an underestimate because a portion of the reservoir was not viewable.

We compared current estimates of angler effort, catch rates, total catch, and harvest of fish with previous surveys. Earlier surveys were conducted to measure differences in effort, catch rates, and harvest before and after regulation changes implemented for the 1990 season in Section 3. Effort in Section 2 increased 27.1%-29.5% in 1990 over the previous two years

after regulation changes on Section 3 that restricted bag limits and gear. The increase in angler effort was attributed to displacement of harvest and bait oriented anglers from Section 3 where they were no longer allowed to fish (Rohrer 1991). Allen (1998) estimated effort in Section 2 at 3,602 hours, but this estimate did not include the first five weeks of the 1995 fishing season. The 1998 effort estimate of 5,283 hours is within the range reported from prior surveys (Rohrer 1989, 1990, 1991; Allen 1998). However, effort in 1999 was higher than any previous year at 7,341 hours and 28.0% higher than 1998 (Table 8).

Table 8. Comparison of estimated angler effort, harvest, total catch, and catch rates for Section 2 from different survey years on the Middle Fork Boise River.

Year	Date[a]	Catch Rates (fish/h)	Angler Effort (h)	Harvest					Released	Total Caught
				WRB	HRB	BT	Other[b]	Total		
1988	5/28-9/2	0.69	4,653	545	633	26	53	1,257	1,966	3,223
1989	5/27-9/1	0.94	4,812	71	1,434	79	61	1,645	2,211	4,503
1990	5/26-8/31	1.29	6,598	863	1,653	117	168	2,801	5,719	8,523
1995	7/1-9/30	0.66	3,602	819	197	0	50	1,066	1,305	2,371
1998	5/23-9/5	0.86	5,283	726[c]		87	35	848	3,672	4,520
1999	5/26-9/6	0.94	7,341	539	59	0	0	598	6,295	6,893

[a] Note: Not all census years include the same portions of the angling season.
[b] Includes cutthroat, whitefish, northern pikeminnow, and/or sucker spp.
[c] Wild and hatchery rainbow combined.

Catch rates from Section 2 during 1998 (0.86 fish/h) and 1999 (0.94 fish/h) were within the range reported in previous years. However, total harvest estimates were between 20.5%-78.9% lower in 1998 and 1999 than reported in previous years. Total harvest from Section 2 in 1999 was estimated to be 17.6% lower than 1998 (Table 8). The difference in harvest between 1998-1999 and previous years could be due to increased angler awareness and the practice of catch and release fishing in the 10-year period between surveys. The decreased harvest in 1999, even though the catch rates were similar between years and effort was higher in 1999, would again suggest that the slogan "If you don't know, be safe and let it go" caused anglers to release more fish of all species because they were uncertain of their catch.

A direct comparison of fishing statistics for Section 3 is problematic because both section length and survey dates have changed over time. Effort, catch rates, and harvest were only calculated for the lower 15.7 km of the whole section by Rohrer (1989) in 1988 and 1989. Only effort was estimated in 1990. Rohrer (1989,1990) reported angler effort estimates of 2,385 h and 4,163 h in 1988 and 1989, respectively, for the 15.7 km reach. Rohrer (1991) calculated only 739 hours of angler effort in 1990 after the regulation change restricting harvest to two trout over 350 mm, restricting terminal gear to fly or lure only with a single, barbless hook, and prohibiting bait. Allen (1998) reported a 1995 angler effort estimate of 1,983 hours for the same section surveyed by Rohrer. However, the 1995 estimate was only for the period from July 1 to September 30, 1995 and did not include the first five weeks of the angling season. Our 1998 and 1999 effort estimates are not directly comparable to these prior surveys as we surveyed a total of 56.3 km. However, we attempted to standardize the data by calculating effort/km for all estimates. The effort/km estimate is comparable to that of previous years (Table 9).

For all sections combined, increased angler effort from 1998 to 1999 may be partially attributable to the warm, dry weather for a majority of the sampling season. Weather in 1998 was not conducive to outdoor activities with cooler temperatures and frequent storms. Recent fires in the drainage resulted in increased turbid runoff after the passing of each storm in 1998, causing Sections 5 and 2 to become muddy for approximately two weeks after each episode. Section 5 was turbid for most of the season. These events did not take place after the initial runoff in the spring of 1999. The pleasant weather in 1999 also caused the river to remain at predictable levels throughout the season for anglers.

Season-long catch rates exceeded management objectives of 0.5 fish/h (IDFG 1995) in all river sections in both 1998 and 1999. The highest rates occurred in Section 3, the special regulation section, with catch rates ranging from 1.33 to 1.60 fish/h over the two years. Catch rates in river sections managed with the statewide general regulations ranged from 0.86 in Section 2 in 1998 to 1.36 in Section 5 in 1999. Except for Section 3, catch rates increased in all sections in 1999 over 1998.

Table 9. Comparison of estimated angler effort, harvest, total catch, and catch rates for Section 3 from different survey years on the Middle Fork Boise River[a].

Year	Date	Catch Rates (fish/h)	Angler Effort (h)	Effort/km (h)	Harvest					Released	Total Caught
					WRB	HRB	BT	Other[b]	Total		
1988	5/28-9/2	1.48	2,935	186.9	623	987	177	83	1,870	2,474	4,344
1989	5/27-9/1	0.76	1,575	100.3	304	107	50	4	465	720	1,189
1990	5/26-8/31		830[c]	52.8							
1995	7/1-9/30	1.04	4,263	75.7	193	92	0	45	330	4,104	4,434
1998	5/23-9/5	1.60	4,247	75.4	57[d]		15	503	575	6,206	6,781
1999	5/26-9/6	1.33	8,786	156.1	23	0	0	0	23	11,682	11,705

[a] Section 3 boundary from 1988-1990 was 15.7 km long; boundary in 1998-1999 was 56.3 km long and included that part from 1988-1990.
[b] Includes cutthroat, whitefish, northern pikeminnow, and/or sucker spp.
[c] Effort only estimated in 1990.
[d] Wild and hatchery rainbow combined.

RECOMMENDATIONS

1. Continue signing and posting of bull trout and other waters to reduce incidental harvest of game fish due to misidentification.

ACKNOWLEDGMENTS

Liz Mamer, Kent Burns, and Rebecca Biladeau collected much of the survey information. Cheryl Leben prepared the final document.

LITERATURE CITED

Allen, D. B., S. P. Yundt, and B. J. Flatter. 1998. Regional fisheries management investigations. Project 1, Job C: Southwest Region rivers and streams investigations. Job Performance Report. Idaho Department of Fish and Game, Boise, Idaho.

Flatter, B. J. 1998. Life history and population status of migratory bull trout *(Salvelinus confluentus*) in Arrowrock Reservoir, Idaho. Idaho Department of Fish and Game to United States Department of the Interior, Bureau of Reclamation. 1425-6-FC-10-02170.

Idaho Department of Fish and Game. 1995. Five-Year Management Plan.

McArthur, T. 1992. Creel census system: Technical reference manual. Job Completion Report. Idaho Department of Fish and Game, Boise, Idaho.

Rohrer, R. L. 1989. Lake & Reservoir investigations. Study 1: Boise River reservoirs. Job Performance Report. Idaho Department of Fish and Game Volume 79:Article 08.

Rohrer, R. L. 1990. Rivers & streams investigations. Study 1, Job 1: Upper Boise River Basin fisheries investigations. Job Performance Report. Idaho Department of Fish and Game Volume 83:Article 04.

Rohrer, R. L. 1991. Rivers & streams investigations. Study 1, Job 1: Upper Boise River Basin fisheries investigations. Job Performance Report. Idaho Department of Fish and Game Volume 83:Article 03.

Schill, D. J. and J. A. Lamansky Jr. 1999. The ability of Southwest Idaho anglers to identify five species of trout. Annual Performance Report. Idaho Department of Fish and Game, Boise, Idaho.

Schmetterling, D. A., and M. H. Long. Montana anglers ability to identify bull trout and other salmonids. Fisheries 24:7.

ANNUAL PERFORMANCE REPORT
SUBPROJECT #2: BULL TROUT MONITORING

State of: Idaho Grant No.: F-73-R-22, Fishery Research

Project No.: 2 Title: Wild Trout Investigations

Subproject 2: Bull Trout Monitoring

Contract Period: July 1, 1999 to June 30, 2000

ABSTRACT

Monitoring adult bull trout *Salvelinus confluentus* at salmon trapping facilities represents one method to monitor bull trout populations in response to Idaho Department of Fish and Game implementation of statewide no-harvest regulations in 1994 and their subsequent listing under the Endangered Species Act in 1998. The Department maintains trapping facilities on four rivers where bull trout and chinook salmon *Oncorhynchus tshawytscha* upstream migrations occur. During 1999, 163 bull trout were collected in the Rapid River upstream trap, similar to the trap counts in 1998. Bull trap counts at Rapid River increased during 1995 and 1996 before declining during 1997 and 1998. Fourteen bull trout were trapped at Crooked River (South Fork Clearwater River). The 1999 total was similar for the past two years at Crooked River. During 1999, the trap at East Fork Salmon River was not operated, and high water resulted in incomplete trap counts at Sawtooth Hatchery. Trap data are inconclusive regarding bull trout population response following implementation of no-harvest regulations in Idaho.

Authors:

F. Steven Elle
Sr. Fisheries Technician

James A. Lamansky Jr.
Sr. Fisheries Technician

INTRODUCTION

Bull trout *Salvelinus confluentus* were petitioned for listing under the Endangered Species Act (ESA) in 1992. In response to proposed listing, Idaho Department of Fish and Game (IDFG) enacted no-harvest regulations January 1, 1994. Subsequently, bull trout were formally listed as a threatened species June 5, 1998. Monitoring of bull trout populations has been a priority of the Department since regulation changes in 1994. Bull trout are collected during operation of IDFG upstream salmon migration weirs at Rapid River (Little Salmon River tributary), East Fork Salmon River, Sawtooth Hatchery (Salmon River headwaters), and Crooked River (South Fork Clearwater River). This report provides an update of bull trout trapping records from these facilities.

METHODS

Upstream trapping facilities are maintained for monitoring and collection of brood stock for chinook salmon *Oncorhynchus tshawytscha* at Crooked River in the Clearwater River drainage and Rapid River, South Fork Salmon River, East Fork Salmon River, and Sawtooth hatcheries in the Salmon River drainage. Bull trout are collected at all facilities except South Fork Salmon River. Some data on bull trout numbers, size, and migration timing have been collected since the construction of salmon facilities, but most has been collected since bull trout were proposed for listing.

RESULTS

A total of 163 bull trout were trapped at Rapid River during 1999 (Table 10). Average size equaled 436 mm total length with 14% >500mm. The 1999 bull trout escapement was similar to 1998.

Fourteen bull trout were trapped at Crooked River. Average size equaled 467 mm total length with 31% >500 mm. Numbers and size of fish was similar to prior years (Table 10).

The trap at East Fork Salmon River was not operated during 1999 due to concerns about potential impacts to chinook salmon, also listed under ESA. High water conditions at Sawtooth Hatchery resulted in incomplete trap records. This was the fourth consecutive year high water precluded accurate bull trout counts at Sawtooth.

Table 10. Bull trout data from trapping at Rapid River, Crooked River, East Fork Salmon River, and Sawtooth hatcheries, 1973-1998.

	Rapid River			Crooked River			EF Salmon River			Sawtooth Hatchery		
Year	No.	Mean	%> 500 mm	No.	Mean	%> 500 mm	No.	Mean	%> 500 mm	No.	Mean	%> 500 mm
1999	163	436	14	14	467	31				8[a]		
98	112	445	17	35	485	37				4[a]		
97	117	454	29	38	473	32	77[a]	461	38	5[a]	370	20
96	221	455	26	36	438	17	175	475	37	4[a]	492	50
95	223	454	14	18	468	22	17[a]	425	12	6[a]	440	17
94	146	421	6				61	469	24	38	363	16
93	149	411	8	2[a]			27[a]	486	33	5[a]		
92	271	412	12	18	459	17	73	437	16	24	414	20
91	293	414	12	1[a]			89	478	44	17	429	12
90	258			32	477	31	2[a]			7		
89	170						37					
88	136											
87	128						12[a]					
86	151						119	420	9	3		
85	149											
84	347						49	414	11			
83	131											
82	91											
81	143											
80	220											
79	262											
78	136											
77	212											
76	414											
75	461											
74	290											
73	114											

[a] Incomplete trap counts due to high water.

DISCUSSION

Numbers of bull trout returning to traps in 1999 appear to be comparable to those in previous years; however, no trends, neither increasing nor decreasing, show in the data.

RECOMMENDATIONS

1. Continue to collect bull trout data during years weirs are operated to collect chinook salmon adults.

ACKNOWLEDGEMENTS

Personnel from Clearwater, Rapid River, and Sawtooth hatcheries operated trapping facilities on Crooked River, Rapid River, and East Fork Salmon River and Sawtooth weirs, respectively. They added bull trout data collection to their normal chinook collection duties.

Prepared by:

James A. Lamansky Jr.
Senior Fisheries Technician

F. Steven Elle
Senior Fisheries Technician

Daniel J. Schill
Principal Fisheries Research Biologist

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

Virgil K. Moore, Chief
Bureau of Fisheries

Steve Yundt
Fishery Research Manager